THE BELL SYSTEM

Technical Journal DEVOTED TO THE SCIENTIFIC

ASPECTS OF ELECTRICAL COMMUNICATION

ADVISORY BOARD

P. A. GORMAN

J. B. Fisk

B. S. GILMER

EDITORIAL COMMITTEE

W. E. DANIELSON, Chairman

F. T. Andrews, Jr.

E. D. REED

E. E. DAVID

M. TANENBAUM

C. W. HOOVER, JR.

S. H. WASHBURN

D. H. LOONEY

Q. W. WIEST

E. C. READ

C. R. WILLIAMSON

EDITORIAL STAFF

G. E. SCHINDLER, JR., Editor L. A. HOWARD, JR., Assistant H. M. PURVIANCE, Production and Illustrations

F. J. Schwetje, Circulation

Editor

INDEX

VOLUME XLV

1966

AMERICAN TELEPHONE AND TELEGRAPH COMPANY **NEW YORK**

LIST OF ISSUES IN VOLUME XLV

No. 1, January	Pages	1-231
No. 2, February		233-343
No. 3, March		345 - 492
No. 4, April		493-660
No. 5, May-June		661 - 764
No. 6, July-August		765 - 992
No. 7, September		993 - 1195
No. 8, October		1197-1371
No. 9, November		1373-1671
No. 10, December		1673-1853

Index to Volume XLV

44	-
Aaron, M. R.	BACK-SPUTTERING 233
Approximation of the Error Probability	BATTERY CHARGERS 64
in a Regenerative Repeater with Quan-	Balch, H. T.
tized Feedback 1845-1847	biographical material 753
ACCEPTANCE NUMBER 495	Estimation of the Mean of a Stationary
Acoustic Scattering of Light in a Fabry- Perot Resonator (M. G. Cohen, E. I.	Random Process by Periodic Sampling 773-741
Gordon) 945-966	BANDLIMITED SIGNALS 117, 359, 1775
Adaptive Equalization 255, 761	BANDPASS FILTERS 40, 348, 1494
AFC	Beam-Lead Technology (M. P. Lepselter)
See Automatic Frequency Control	233–253
AGC	BEAM-MATCHING 287
See Automatic Gain Control ALARM CIRCUITS 4, 782, 826	BEAM WAVEGUIDES 105, 451, 743, 1339, 1345
Alloys 493	Becker, F. K.
AM/PM Conversion 1749	Application of Automatic Transversal
Amplifiers 5, 835	Filters to the Problem of Echo Supres-
AMPLITUDE MODULATION 767, 1775	sion 1847-1850
Andover, Maine Earth Station 1439	New Signal Format for Efficient Data
Angle Error Measurements 1439	Transmission 755-758
Antennas 5	Beneš, V. E.
Antireflection Coatings 1611	biographical material 1665, 1837
Application of Automatic Transversal Fil-	Programming and Control Problems
ters to the Problem of Echo Suppression	Arising from Optimal Routing in
(F. K. Becker, H. R. Rudin)	Telephone Networks 1373-1438
1847-1850	Some Examples of Comparisons of
Approximation of the Error Probability	Connecting Networks 1829–1835
in a Regenerative Repeater with Quan-	BINARY GROUP CODES 561
tized Feedback (M. R. Aaron, M. K.	BINARY SYMMETRIC CHANNELS 967
Simon) 1845–1847	BIORTHOGONAL CODES 1257
Atmospheric Attenuation 301, 1439	Bleisch, G. W.
Attenuation of 3.392 µ He-Ne Laser Radia-	biographical material 985
tion by Methane in the Atmosphere	N3 Carrier System: Objectives and Trans-
7. Chu, D. C. Hogg) 301–306	mission Features 767-799
ATTI CATION LOSSES 723, 1197	BLOCK CODING 967
AUTOMATIC FREQUENCY CONTROL 424,	BLOCK DIAGRAM COMPILER 345, 1496
771, 816, 1689, 1705, 1737	BLOCKING PROBABILITY 1377, 1829
AUTOMATIC GAIN CONTROL 57, 811, 1023	BLODIB
AVALANCHE DIODES 989, 1797	See Block Diagram Compiler
Avalanche Region of IMPATT Diodes	-
(H. K. Gummel, D. L. Scharfetter) 1797–1827	Bose-Chaudhuri Codes 275, 589, 1045, 1057

Bound on the Reliability of Block Coding with Feedback (J. E. Savage) 967-977

BOUNDED-DISTANCE DECODING 1273

Bounds for Certain Multiprocessing Anomalies (R. L. Graham) 1563–1581

Bounds on Communication with Polyphase Coding (A. D. Wyner) 523-559

Bowie, L. A.

biographical material 985

Equipment Design of N3 Carrier Terminals and Carrier Supply 845-894

Brilliant, M. B.

biographical material 1837

Determination of Frequency in Systems of Mutually Synchronized Oscillators 1737-1747

B.S.T.J. Recommendation for Adopting the International System (SI) of Units 765-766

Buchner, M. M.

biographical material 491

Computing the Spectrum of a Binary Group Code 441-449

Buffer Overflow 149

Burckhardt, C. B.

Display of Holograms in White Light 1841-1844

C

Capacity of the Band-Limited Gaussian Channel (A. D. Wyner) 359-395

CAPACITY/VOLTAGE CURVES 1097

CARRIER SUPPLIES

See Frequency Supplies

CARRIER SYSTEMS 767

CASCADED NETWORKS 631, 1153

Chang, R. W.

biographical material 1837

Synthesis of Band-Limited Orthogonal Signals for Multichannel Data Transmission 1775-1796

Chu, T. S.

biographical material 333

Attenuation of 3.392µ He-Ne Laser Radiation by Methane in the Atmosphere 301-306

Geometrical Representation of Gaussian Beam Propagation 287-299 Circuit Design of the N3 Carrier Terminal (R. L. Haner, I. E. Wood) 801-844

CIRCUIT FAILURES 1299

CLOCK CIRCUITS

See Frequency Supplies

Clustering 1324

CLUTTER (RADAR NOISE) 1285

COAXIAL CABLES 1008, 1197

Codes 149, 275, 441, 561, 967, 997, 1045, 1057, 1247, 1273

Coding 151, 441, 523, 597, 689, 1273, 1477

Cohen, M. G.

biographical material 985

Acoustic Scattering of Light in a Fabry-Perot Resonator 945-966

COINAGE 493

COLOR CODING 597

Combinatorial Analysis 1373, 1829

Communication Theory 143, 359, 523, 761, 967, 1197, 1247, 1475

COMPANDORS 777

Comparison Between a Gas Lens and Its Equivalent Thin Lens (D. Marcuse) 1339-1344

COMPATIBLE COINAGE 493

Compilers (Programs) 345, 929, 1496

Computer Scheduling 1563

Computer Simulation 117, 169, 345, 689, 1132, 1496

Computing the Spectrum of a Binary Group Code (M. M. Buchner)

441-449

Conference Circuits 1673 Conklin, G. E.

biographical material 753

Observed 50 to 60 Gc/s Attenuation for the Circular Electric Wave in Dielectric-Coated Cylindrical Waveguide Bends 723-732

Connecting Networks 1373, 1829

COOLING SYSTEMS 27

Coupling Coefficients 287

Cross, T. G.

biographical material 1837

Intermodulation Noise in FM Systems
Due to Transmission Deviations and
AM/PM Conversions 1749-1773

CROSSTALK 786

5

Customer Evaluation of Telephone Circuis with Delay (G. K. Helder)

CYCLIC CODES 561, 759, 1045, 1057, 1273 CYLINDRICAL WAVEGUIDES 723

D

Dale, J. C. biographical material 753 Estimation of the Mean of a Stationary

Random Process by Periodic Sampling

733–741

DATA STORAGE 149, 597
DECISION THRESHOLD 307

Decoding 149, 759, 1001, 1273

Deformation of Fields Propagating Through Gas Lenses (D. Marcuse) 1345-1368

DELAY MEASUREMENT 397 DELAY TIME 1157, 1673

Delta Modulation Quantizing Noise Analytical and Computer Simulation Results for Gaussian and Television Input Signals (J. B. O'Neal)

117-141

Design Considerations and Proposals for Compatible U. S. Subsidiary Coinage (R. A. Kimber, R. R. Stokes)

Design of an Electro-Optic Polarization Switch for a High-Capacity High-Speed Digital Light Deflection System (S. K. Kurtz) 1209-1246

DETECTION

See Signal Detection

Determination of Frequency in Systems of Mutually Synchronized Oscillators (M. B. Brilliant) 1737–1747

DIAGNOSTICS (COMPUTER DATA) 931, 1299

DIELECTRIC WAVEGUIDES 97, 723

DIFFERENCE-SET CYCLIC CODES 1045, 1057

Difference-Set Cyclic Codes (E. L. Weldon) 1045-1055

DIFFERENTIAL PULSE CODE MODULATION 689, 1123

DIFFUSION MASKS 661
Digital Computer Simulation of Sampled-

Data Communication Systems Using the Block Diagram Compiler: BLODIB (R. M. Golden) 345–358

DIGITAL FREQUENCY MODULATION 1511 DIGITAL LIGHT DEFLECTORS 597, 1209 DIGITAL REPEATERS 993

DISCRIMINATORS 59, 1511

Display of Holograms in White Light (C. B. Burckhardt) 1841–1844

DISTRIBUTED-PARAMETER SYSTEMS 631, 1153

DISTRIBUTION CIRCUITS 839, 886

Diversity Switching 13 Dorros, I.

biographical material 1193

Experimental 224 Mb/s Digital Repeatered Line 993-1043

Duration of Fades Associated with Radar Clutter (A. J. Rainal) 1285-1298

E

Early Bird Satellite 1439 Echo Suppressors 1157, 1847, 1851 Eddy Currits 495

Eddy, T. W.

biographical material 753

Estimation of the Mean of a Stationary Random Process by Periodic Sampling 733-741

Effect of a Finite-Width Decision Threshold on Binary Differentially Coherent PSK Systems (W. M. Hubbard) 307-319

Effects of Transmission Delay In Four-Wire Teleconferencing (A. G. Vartabedain) 1673-1688

ELECTRICAL FILTERS 476, 631, 1782 ELECTRICAL NETWORKS 631, 1639

ELECTRO-OPTIC MODULATORS 946, 1209

ELECTROFORMING 233

ELECTROLUMINESCENT JUNCTIONS 1599
Electron Beam Heating of a Thin Film on a
Highly Conducting Substrate (J. A.
Morrison, S. P. Morgan) 661-687
ELECTRON MICROSCOPY 651

Electron Phase Contrast Images of Molecular Detail (R. D. Heidenreich)

651-656

ELECTRONIC SWITCHING SYSTEMS 1299 Elliott, E. O. biographical material 1369 Use and Performance of Error-Voiding and Error-Marking Codes 1273-1283 ENCODING See Coding Enloe, L. H. Hologram Transmission via Television 335-339 Environmental Testing 250 EQUALIZATION 90, 255, 761 EQUIPMENT BAYS 73, 437, 847 Equipment Design of N3 Carrier Terminals and Carrier Supply (W. J. Giguere, L. A. Bowie, J. A. Watters) 845-894 EQUIPMENT SHELTERS 77 ERROR-CORRECTING CODES 275, 441, 561, 1045, 1273 Error Probabilities in Data System Pulse Regenerator with DC Restoration (P. L. Zador) 979-984 ERROR PROBABILITY 150, 275, 307, 361, 550, 695, 967, 979, 1247, 1845 ERROR RATES 759, 995, 1273, 1511 Estimation of the Mean of a Stationary Random Process by Periodic Sampling (H. T. Balch, J. C. Dale, T. W. Eddy, R. M. Lauver) 733-741

F .

Experimental 224 Mb/s Digital Repeatered

Waldhauer) 993-1043

FABRY-PEROT RESONATORS 945

biographical material 1665

Phase Vocoder 1493-1509

EYE PATTERNS 280, 1011

Line (I. Dorros, J. M. Sipress, F. D.

Fading 1285
Fano Algorithm 151
Farber, D. J.
biographical material 985
SNOBOLS Programming Language
895-944
Ferrite Isolators 25
Filters
See Electrical Filters
Flanagan, J. L.

FOUR-WIRE CIRCUITS 1673 Franks, L. E. biographical material 657 Model for the Random Video Process 609-630 FREQUENCY ALLOCATION 10, 771 FREQUENCY CONTROL See Automatic Frequency Control FREQUENCY DIVISION MULTIPLEXING 1, 767 FREQUENCY MODULATION 1197, 1511. 1537, 1749 FREQUENCY SUPPLIES 829, 875, 1689, 1705, 1737 Friis, R. W. biographical material 229 TM-1/TL-2 Short Haul Microwave Systems 1-95

G

Gallium Phosphide 1599
Gas Lenses 321, 1339, 1345
Gaussian Beams 287, 451
Gaussian Channels 359, 523, 968, 1247, 1475

Gaussian Processes 1071
Gaussian Signals 117
Geometric Interpretation of Diagnostic
Data from a Digital Machine: Based
on a Study of the Morris, Illinois
Electronic Central Office (J. B. Kruskal,
R. E. Hart) 1299–1338

Geometrica Models 1247, 1299 Geometrical Representation of Gaussian Beam Propagation (T. S. Chu)

Gershenzon, M.

biographical material 1663
State of the Art in GaP Electroluminescent Junctions 1599-1609
Gersho, A.

biographical material 1193, 1838
Mutual Synchronization of Geographically

Separated Oscillators 1689–1704 Stability Criterion for Nonuniformly Sampled and Distributed Parameter Systems 1153–1155

Giguere, W. J. biographical material 985-986 Equipment Design of N3 Carrier Terminals and Carrier Supply 845-894

Goetzberger, A. biographical material 1193

Ideal MOS Curves for Silicon

1097-1122

Golden, R. M.

biographical material 491, 1665
Digital Computer Simulation of Sampled
Data Communication Systems Using
the Block Diagram Compiler: BLODIB
345-358

Phase Vocoder 1493-1509

Gordon, E. I.

biographical material 986

Acoustic Scattering of Light in a FabryPerot Resonator 945-966

Gordon, J. P.

biographical material 333 Optics of General Guiding Media

321-332

Graham, R. L.

autobiographical material 1193, 1664

Bounds for Certain Multiprocessing

Anomalies 1563-1581

Number of Information Symbols in Difference Set Cyclic Codes 1057-1070

GRAY CODES 276 Griswold, R. E.

biographical material 986 SNOBOL3 Programming Language

NOBOLS Programming Language 895–944

Gummel, H. K.
biographical material 1838
Avalanche Region of IMPATT Diodes
1797-1827

H

HAMMING DISTANCE 1300

Haner, R. L. biographical material 986

Circuit Design of the N3 Carrier Terminal 801-844

HARMONIC GENERATORS 831, 876 Hart. R. E.

biographical material 1369

Geometric Interpretation of Diagnostic Data from a Digital Machine: Based on Study of the Morris, Illinois Electronic Central Office 1299-1338

HE-NE LASERS 301

HE-XE LASERS 301

HEAT FLOW 661 Heidenreich, R. D.

biographical material 657

Electron Phase Contrast Images of Molecular Detail 651-656

Helder, G. K.

biographical material 1194

Customer Evaluation of Telephone Circuits with Delay 1157-1191

Hogg, D. C. biographical material 333

Attenuation of 3.392µ He-Ne Laser Radiation in the Atmosphere 301-306

Hologram Transmission Via Television (L. H. Enloe, J. A. Murphy, C. B. Rubinstein) 335-339

Holograms 335, 659, 1841

Holtzman, J. M.

biographical material 491

Signal-Noise Ratio Maximization Using the Pontryagin Maximum Principle 473-489

Hubbard, W. M.

biographical material 333

Effect of a Finite-Width Decision Threshold on Binary Differentially Coherent PSK Systems 307-319

I

Ideal MOS Curves for Silicon (A. Goetzberger) 1097-1122

IF Amplifiers 52

IMPATT DIODES 989, 1797

IMPEDANCE FUNCTIONS 1669

IMPEDANCE MATCHING 287

Increasing the Memory Capacity of the Digital Light Deflector by "Color Coding" (J. G. Skinner) 597-608

INDEX OF REFRACTION 1439

Information Rate of a Coaxial Cable with Various Modulation Systems (J. R. Pierce) 1197-1207

INFORMATION THEORY

See Communication Theory

INFRARED LASERS 301

Insertion Loss, Phase and Delay Measuring Set for Characterizing Transistors and Two-Port Networks Between 0.25 and 4.2 gc (D. Leed) 397-440

Integrated Circuits 233, 661, 1639
Intermodulation Noise in FM Systems Due
to Transmission Deviations and
AM/PM Conversions (T. G. Cross)
1749-1773

International System of Units 765 Intersymbol Interference 755, 761, 1475, 1775

Irby, C. W.

N3 Carrier System: Objectives and Transmission Features 767-799

J

Jansen, J. J.
biographical material 229
TM-1/TL-2 Short Haul Microwave
Systems 1-95

Jensen, R. M. biographical material 229-230 TM-1/TL-2 Short Haul Microwave Systems 1-95

K

Kadota, T. T. biographical material 1194

Simultaneously Orthogonal Expansion of Two Stationary Gaussian Processes— Examples 1071–1096

Karafin, B. J.

biographical material 1838

Mutual Synchronization of Geographically Separated Oscillators 1689–1704

Karnaugh, M.

biographical material 1838

Model for the Organic Synchronization of Communications Sustems 1705-1733 Kimber, R. A.

biographical material 657

Design Considerations and Proposals for Compatible U. S. Subsidiary Coinage 493-522 Kinariwala, B. K.

biographical material 657, 1194

Stability Criterion for Nonuniformly Sampled and Distributed Parameter Systems 1153-1155

Theory of Cascaded Structures: Lossless Transmission Lines 631-649

King, H. T.

biographical material 230

TM-1/TL-2 Short Haul Microwave Sustems 1-95

KLYSTRONS 23 Kretzmer, E. R.

> New Signal Format for Efficient Data Transmission 755-758

Kruskal, J. B.

biographical material 1369

Geometric Interpretation of Diagnostic Data from a Digital Machine: Based on a Study of the Morris, Illinois Electronic Central Office 1299–1338

Kurtz, S. K.

biographical material 1369-1370

Design of an Electro-Optic Polarization
Switch for a High-Capacity HighSpeed Digital Light Deflection System
1209-1246

L

Labevrie, A. E.

Multicolor Howgraphic Image Reconstruction with White-Light Illumination 659-660

LAMINATED METALS 493

Landau, H. J.

biographical material 1370

Optimality of the Regular Simplex Code 1247-1272

Laser Cavities with Increased Axial Mode Separation (A. D. White) 339-343

Lasers 301, 339, 1583

Lauver, R. M.

biographical material 753-754

Estimation of the Mean of a Stationary Random Process by Periodic Sampling

733-741

Leed, D.

biographical material 491

Insertion Loss, Phase and Delay Measuring Set for Characterizing Transistors and Two-Port Networks Between 0.25 and 4.2 gc 397-440

LENS WAVEGUIDES

See Beam waveguides

Lenses 105, 321, 1339, 1345

Lepselter, M. P.

biographical material 333

Beam-Lead Technology 233-253

LIGHT GUIDES

See Optical Waveguides

LIFE TESTING 233

LIGHT TRANSMISSION

See Optical Transmission

Light Transmission in a Multiple Dielectric (Gaseous and Solid) Guide (E. A. J. Marcatili) 97–103

Lin, L. H.

Multicolor Holographic Image Reconstruction with White-Light Illumination 659-660

LINEAR PROGRAMMING 1401

Liou, M. L.

biographical material 1666

Noise in an FM System Due to an Imperfect Linear Transducer

1537-1561

1057-1070

LOSSLESS TRANSMISSION LINES

631, 1153

Lucky, R. W.

biographical material 334

Techniques for Adaptive Equalization of Digital Communication Systems 255–286

M

Macwilliams, J.

biographical material 1194

Number of Information Symbols in Difference-Set Cyclic Codes

MAINTENANCE 81, 784

Marcatili, E. A. J.

biographical material 230

Light Transmission in a Multiple Dielectric (Gaseous and Solid) Guide 97-103 Ray Propagation in Beam-Waveguides with Redirectors 105-115

Marcuse, D.

biographical material 754, 1370

Comparison Between A Gas Lens and Its Equivalent Thin Lens 1339-1344

Deformation of Fields Propagating Through Gas Lenses 1345-1368

Physical Limitations on Ray Oscillation Suppressors 743-751

Marinaccio, L. P.

1/4-Watt Si PvN X-Band IMPATT (IMPact Avalanche Transit Time) Diode 989-991

Mathematical Model of a Vibrating Soil-Foundation System (G. F. Weissmann) 177-228

MATHEMATICAL MODELS 177, 359, 609, 1247, 1299, 1705, 1737

Mazo, J. E.

biographical material 1666

Theory of Error Rates for Digital FM 1511-1535

McDonald, R. A.

biographical material 1194-1195

Signal-to-Noise and Idle Channel Performance of Differential Pulse Code Modulation Systems—Particular Applications to Voice Signals

1123-1151

MEAN VALUE 733

MEMORY (STORAGE)

See Data Storage

MEMORYLESS CHANNELS 151, 967

METAL-OXIDE-SEMICONDUCTOR FILMS

1097

METALLURGY 493

MICROWAVE RELAY SYSTEMS 1

MILLIMETER WAVES 723

Misawa, T.

1/4-Watt Si PvN X-Band IMPATT (IMPact Avalanche Transit Time) Diode 989-991

Mode Conversion 287, 723

Mode Coupling 287, 723

Mode Suppression 339

Model for the Organic Synchronization of Communications Systems (M. Karnaugh) 1705–1733 Model for the Random Video Process (L. E. Franks) 609-630

Modems (Modulator-Demodulators)

Modes

See Propagation Modes

MODULATION

See Amplitude Modulation Frequency Modulation Phase Modulation

Pulse Code Modulation

Modulators 49

Morgan, S. P.

biographical material 754

Electron Beam Heating of a Thin Film on a Highly Conducting Substrate 661-687

Morris, Illinois Electronic Central Office 1299

Morrison, J. A.

biographical material 754

Electron Beam Heating of a Thin Film on a Highly Conducting Substrate 661-687

Multicolor Holographic Image Reconstruction with White-Light Illumination (L. H. Lin, K. S. Pennington, G. W. Stroke, A. E. Labeyrie) 659-660

Multiplexing 16, 767, 993, 1775

MULTIPROCESSING 1563

Murphy, J. A.

Hologram Transmission via Television 335-339

Mutual Synchronization of Geographically Separated O. illators (A. Gersho, B. J. Karafin) 1689-1704

N

NETWORKS (CIRCUITS)
See Electrical Networks

NETWORKS (COMMUNICATION SYSTEM INTERCONNECTIONS) 1373, 1689,

1705, 1737, 1829

New Signal Format for Efficient Data Transmission (F. K. Becker, E. R. Kretzmer, J. R. Sheehan) 755-758

Noise (Interference) 117, 359, 479, 523, 561, 727, 1247, 1273, 1435, 1537,

Noise in an FM System Due to an Imperfect Linear Transducer (M. L. Liou) 1537-1561

Number of Information Symbols in Difference-Set Cyclic Codes (R. L. Graham, J. Macwilliams) 1057-1070

N3 Carrier System: Objectives and Transnission Features (G. W. Bleisch, C. W. Irby) 767-799

N3 Carrier Terminals 801, 845 Nyquist Criterion 755

0

Observed 50 to 60 Gc/s Attenuation for the Circular Electric Wave in Dielectric-Coated Cylindrical Waveguide Bends (G. E. Conklin) 723-732

OHMIC CONTACTS 233

O'Neal, J. B.

biographical material 230, 754

Delta Modulation Quantizing Noise Analytical and Computer Simulation Results for Gaussian and Television Input Signals 117-141

Predictive Quantizing Systems (Differential Pulse Code Modulation) for the Transmission of Television Signals 689-721

1/4-Watt Si PvN X-Band IMPATT (IMPact Avalanche Transit Time) Diode (T. Misawa, L. P. Marinaccio)

OPTICAL-ACOUSTICAL INTERACTIONS 945

OPTICAL FILTERS 631

OPTICAL MEASUREMENTS 1583 OPTICAL MODES 97, 287, 339

OPTICAL RESONATORS 339, 945

OPTICAL SCANNING 129, 609, 698

OPTICAL STORAGE 597

OPTICAL TRANSMISSION 97, 105, 287, 301, 1339, 1345

OPTICAL WAVEGUIDES 97, 105, 451, 1339, 1345

Optics of General Guiding Media (J. P. Gordon) 321-332

Optimality of the Regular Simplex Code
(H. J. Landau, D. Slepian)

1247-1272

ORTHOGONAL MULTIPLEXING 1775
OSCILLATORS
See Frequency Supplies
OXIDE COATINGS 661, 1097

P

PARABOLIC ANTENNAS 5
PARITY CHECKS 443, 561
PATTERN MATCHING 895
PCM
See Pulse Code Modulation

Pennington, K. S.

Multicolor Holographic Image Reconstruction with White-Light Illumina-

tion 659-660

Performance of a Forward-Acting ErrorControl System on the Switched Telephone Network (E. J. Weldon)

759-761

Phase and Amplitude Measurements of
Coherent Optical Wavefronts (J. T.
Ruscio) 1583-1597

Phase Contrast Images 651
Phase Detectors 143

Phase-Locked Loop 1583
Phase Measurement 397, 1583

Phase Measurement 397, 1583 Phase Modulation 523, 1749

Phase Principle for Detecting Narrow-Band Gaussian Signals (A. J. Rainal)

Phase-Shift Keying 307
Phase Vocoder (J. L. Flanagan, R. M. Golden) 1493–1509

Phonon-Photon Interactions 945

Рноторов 1611

PHOTOELASTICITY 945

Physical Limitations on Ray Oscillation Suppressors (D. Marcuse) 743-751 PICTUREPHONE SERVICE 117

Pierce, J. R.

biographical material 1370
Information Rate of a Coaxial Cable
with Various Modulation Systems

1197-1207

Plug-In Units 859
Polarization Switches 1209
Polonsky, I. P.
biographical material 987

SNOBOL3 Programming Language

POLYPHASE CODING 523
PONTRYAGIN MAXIMUM PRINCIPLE 473

Power Supplies 63, 843, 1036 Pre-Emphasis 5, 88, 1149, 1537, 1749 Preamplifiers 40

Predictive Quantizing Systems (Differential Pulse Code Modulation) for the Transmission of Television Signals (J. B. O'Neal) 689-721

Presti, A. J.
Self-Adaptive Echo Canceller

1851–1853

Prisms 106, 1210 Probability Studies 149, 361, 569,

1071, 1285, 1835, 1845 Programming and Control Problems Arising from Optimal Routing in Telephone

Networks (V. E. Beneš) 1373-1438 Programming Languages 895

PROLATE SPHEROIDAL WAVE FUNCTIONS 373

Propagation Modes 97, 287, 339 PSK

See Phase-Shift Keying

Pulse Code Modulation 117, 307, 689, 993, 1123, 1705, 1737

689, 993, 1123, 1705, 1737 Pulse Regenerators 979, 1019, 1845

0

QUANTIZATION 689, 1123, 1845 QUANTIZING NOISE 112, 117, 689

R

RADAR SIGNALS 1285
RADAR TRACKING 1439
RADIATION DAMAGE 662
Rainal, A. J.

biographical material 230, 1370

Duration of Fades Associated with Radar

Clutter 1285–1298

Phase Principle for Detecting Narrow-Band Gaussian Signals 143-148

RANDOM PROCESSES 733, 979

Random Tropospheric Angle Errors in Microwave Observations of the Early Bird Satellite (J. H. W. Unger) 1439-1474 RAY OSCILLATION SUPPRESSORS 743

Ray Propagation in Beam-Waveguides with

Redirectors (E. A. J. Marcatili)

105-115

RC FILTERS 123
READ DIODES 1797

Realizability Conditions for the impedance Function of the Lossless Tapered Transmission Line (P. L. Zador) 1669–1671

RECEIVERS 40
RECOMBINATION RADIATION 1599
REDIRECTORS
See Prisms

RELIABILITY 4
REROUTING
See Telephone Traffic Routing

RESONANT CAVITIES 339
ROUTING
See Telephone Traffic Routing
Rubenstein, C. B.

Hologram Transmission via Television 335-339

Rudin, H. R.

Application of Automatic Transversal

Filters to the Problem of Echo Suppression 1847–1850

Ruscio, J. T.
biographical material 1664
Phase and Amplitude Measurements of
Coherent Optical Wavefronts
1583-1597

S

Salz, J.

biographical material 1666-67

Theory of Error Rates for Digital FM
1511-1535

Sampled-Data Filters 352 Sampling 128, 733, 1497 Sandberg, I. W.

biographical material 1667 Sensitivity of Channel Capacity for the Gaussian Bandlimited Channel

Theory of Optimization Problem That Arises in Communication Theory 761-764 SATELLITE COMMUNICATIONS 1157
Savage, J. E.
biographical material 230, 987
Bound on the Reliability of Block Coding

with Feedback 967-977
Sequential Decoding—The Computation
Problem 149-175

Scanning See Optical Scanning

Scharfetter, D. L. biographical material 1838 Avalanche Region of IMPATT Diodes 1797-1827

Schneider, M. V. biographical material 1665 Schottky Barrier Photodiodes with Antireflection Coating 1611-1638

Schottky Barrier Photodiodes with Antireflection Coating (M. V. Schneider) 1611-1638

Self-Adaptive Echo Canceller (M. M. Sondhi, A. J. Presti) 1851-1853 SEMICONDUCTOR DEVICES 233, 661, 989, 1797, 1599, 1611

Sensitivity of Channel Capacity for the Gaussian Bandlimited Channel (I. W. Sandberg) 1475-1492

Sequential Decoding—The Computation Problem (J. E. Savage) 149–175 Sheehan, J. R.

New Signal Format for Efficient Data Transmission 755-758

SHORT-HAUL CARRIER SYSTEMS 767
SHORT-HAUL MICROWAVE SYSTEMS 1
SIGNAL DESIGN 479, 689, 755, 1775
SIGNAL DETECTION 143, 733, 939

Signal-Noise Ratio Maximization Using the Pontryagin Maximum Principle (J. M. Holtzman) 473-489

SIGNAL REGENERATION 307, 939
Signal-to-Noise and Idle Channel Performance of Differential Pulse Code
Modulation Systems—Particular Applications to Voice Signals (R. A.
McDonald) 1123-1151

Signal-to-Noise Ratio 117, 143, 307, 473, 689, 1008, 1126, 1758

SILICON 1097 Simon, M. K. Approximation of the Error Probability in a Regenerative Repeater with Quantized Feedback 1845–1847 SIMPLEX CODES 1247 Simultaneously Orthogonal Expansion of Two Stationary Gaussian Processes—

Simultaneously Orthogonal Expansion of Two Stationary Gaussian Processes— Examples (T. T. Kadota) 1071-1096 Sinden, F. W.

biographical material 1665

Topology of Thin Film RC Circuits 1639-1662

SINGLE-SIDEBAND TRANSMISSION 767,

Sipress, J. M. biographical material 1195 Experimental 224 Mb/s Digital Repeatered Line 993-1043

Skinner, J. G.

biographical material 658

Increasing the Memory Capacity of the
Digital Light Deflector by "Color

Coding" 597-608 Slepian, D.

biographical material 1371
Optimality of the Regular Simplex Code
1247-1272

SMITH CHARTS 287 SNOBOL3 Programming Language (D. J. Farber, R. E. Griswold, I. P. Polonsky) 895-944

Soil Mechanics 177

Some Examples of Comparisons of Connecting Networks (V. E. Beneš)

1829-1835

Sondhi, M. M.
Self-Adantive Echo Canceller

Self-Adaptive Echo Canceller 1851–1853

Speech Analysis 1170, 1493 Speech Spectra 1133, 1493

Sputtering 233 Square-Law Detectors 143

Stability Criteria 1153, 1689, 1705 Stability Criterion for Nonuniformly Sampled and Distributed Parameter Systems (B. K. Kinariwala, A. Gersho) 1153-1155

State of the Art in GaP Electroluminescent Junctions (M. Gershenzon) 1599-1609 STATISTICAL ANALYSES 149, 451, 609, 733

Statistical Effects of Random Variations in the Components of a Beam Waveguide (W. H. Steier) 451-471

Steier, W. H.

biographical material 491-492

Statistical Effects of Random Variations in the Components of a Beam Waveguide 451-471

Stokes, R. R.

biographical material 658

Design Considerations and Proposals for Compatible U. S. Subsidiary Coinage 493-522

STORAGE

See Data Storage

STRING MANIPULATION 895

Stroke, G. W.

Multicolor Holographic Image Reconstruction with White-Light Illumination 659-660

SUBJECTIVE EVALUATIONS 1157, 1673 SUBSTRATES 661

SWITCHED TELEPHONE NETWORK 759, 1373, 1829

SYNCHRONIZATION

See Timing

Synchronization Recovery Techniques for Binary Cyclic Codes (S. Y. Tong) 561-596

Synthesis of Band-Limited Orthogonal Signals for Multichannel Data Transmission (R. W. Chang) 1775-1796

System Objectives 3, 785

T

TAPERED TRANSMISSION LINES 1669 TASI

See Time Assignment Speech Interpolation

Techniques for Adaptive Equalization of Digital Communication Systems (R. W. Lucky) 255–286

TELECONFERENCES

See Telephone Conference Calls

TELEPHONE CONFERENCE CALLS 1673
TELEPHONE TRAFFIC ROUTING 1373,

1829

TELEVISION SIGNALS 117, 609, 689
TELEVISION TRANSMISSION 87, 117, 335
TEMPERATURE CONTROL 27, 36
TEMPERATURE DISTRIBUTIONS 661
TEST SETS 397
Theory of Cascaded Structures: Lossless

Theory of Cascaded Structures: Lossless Transmission Lines (B. K. Kinariwala) 631–649

Theory of Error Rates for Digital FM
(J. E. Mazo, J. Salz) 1511-1535
Theory of Optimization Problem That
Arises in Communication Theory
(I. W. Sandberg) 761-764

THERMAL CONDUCTIVITY 661 THIN FILMS 652, 661, 1639

TIME ASSIGNMENT SPEECH INTERPOLATION

Time Division Multiplexing 993
Timing 561, 1015, 1689, 1705, 1737
TM-1/TL-2 Short Haul Microvave Systems (R. W. Friis, J. J. Jansen, R. M. Jensen, H. T. King) 1-95
Tong, S. Y.

biographical material 658
Synchronization Recovery Techniques for
Binary Cyclic Codes 561-596

Topology of Thin Film RC Circuits (F. W. Sinden) 1639–1662
TRAFFIC THEORY 1373, 1829
TRANSFER FUNCTIONS 349

TRANSISTOR PARAMETERS 397
TRANSISTORS 233, 397
TRANSIT-TIME DEVICES 989, 1797
TRANSPORTER OF TRANSPORTER 18 776

Transmission Levels 5, 776
Transmission Lines 631, 1669

Transmission Losses 4, 301, 723, 1197
Transmitters 19
Transversal Filters 761, 1847

TRAVELING-WAVE TUBES 37
TREE CODES 151

Tropospheric Propagation 1439 Two-Port Networks 397, 631 TWT's

See Traveling-Wave Tubes

U

Unger, J. H. W. biographical material 1667 Random Tropospheric Angle Errors in Microwave Observations of the Early Bird Satellite 1439-1474 Use and Performance of Error-Voiding and

Error-Marking Codes (E. O. Elliott) 1273-1283

V

Variance 736
Variabedain, A. G.
biographical material 1838–1839
Effects of Transmission Delay in Four-Wire Teleconferencing 1673–1688
Vibrating Soil-Foundation Systems

VIDEO SIGNALS

See Television Signals
VOCODERS 345, 1493
VOICE SIGNALS 1123, 1493

W

Waldhauer, F. D. biographical material 1195 Experimental 224 Mb/s Digital Repeatered Line 993-1043

Watters, J. A.
biographical material 987
Equipment Design of N3 Carrier Terminals and Carrier Supply 845-894

Wave Equations 321

Wavefront Reconstruction 335, 659, 1841

Waveguides 27, 97, 105, 451, 723 Weissmann, G. F.

biographical material 231

Mathematical Model of a Vibrating
Soil-Foundation System 177-228

Weldon, E. J.

biographical material 1195
Difference-Set Cyclic Codes 1045-1055
Performance of a Forward-Acting ErrorControl System on the Switched Telephone Network 759-761

White, A. D.

Laser Cavities with Increased Axial Mode Separation 339–343

- WHITE LIGHT 659, 1841
- WKB Approximation 321
- WOLLASTON PRISMS 1210
- Wood, I. E.
 - biographical material 987 Circuit Design of the N3 Carrier Termi
 - nal 801-844
- Wyner, A. D.
- biographical material 492, 658
- Bounds on Communication with Polyphase Coding 523-559

- Capacity of the Band-Limited Gaussian Channel 359–395
 - Z
- Zador, P. L.
 - biographical material 987
 - Error Probabilities in Data System Pulse Regenerator with DC Restoration
 - 979-984
 - Realizability Conditions for the Impedance Function of the Lossless Tapered Transmission Line 1669–1671



